STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: December 7, 2018

FROM: Matt Urban
Chief, Operations Management Section

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT Dredge & Fill Application
Gilford, 41655

TO Gino Infascelli, Public Works Permitting Officer
New Hampshire Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Forwarded herewith is the application package prepared by NH DOT Bureau of Highway Design for the subject Major impact project. This project is classified as Major per Env-Wt 303.02(p). The project is located on the southbound on-ramp from NH Route 11A to US3 over an unnamed stream in the Town of Gilford, NH. The proposed work consists of rehabilitating an 84" CMP by installing a concrete invert lining.

This project was reviewed at the Natural Resource Agency Coordination Meeting on August 15th 2018. A copy of the minutes has been included with this application package. A copy of this application and plans can be accessed on the Departments website via the following link: http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/wetland-applications.htm

Mitigation is not required for this project as discussed at the Natural Resource Agency Coordination Meeting.

A payment voucher has been processed for this application (Voucher #550468) in the amount of $852.00.

The lead people to contact for this project are Christopher Carucci, Bureau of Highway Design (271-2731 or Christopher.Carruci@dot.nh.gov) or Matt Urban, Chief Operations Management Section, Bureau of Environment (271-3226 or Matt.Urban@dot.nh.gov).

If and when this application meets with the approval of the Bureau, please send the permit directly to Matt Urban, Chief Operations Management Section, Bureau of Environment.

MRU:mru
Enclosures
cc:
BOE Original
Town of Gilford (4 copies via certified mail)
David Trubey, NH Division of Historic Resources (Cultural Review Within)
Carol Henderson, NH Fish & Game (via electronic notification)
Maria Tur, US Fish & Wildlife (via electronic notification)
Mark Kern, US Environmental Protection Agency (via electronic notification)
Michael Hicks, US Army Corp of Engineers (via electronic notification)
Kevin Nyhan, BOE (via electronic notification)

S:\Environment\PROJECTS\GILFORD\41655\Wetlands\WETAPP - Highway.doc

CULVERT REHABILITATION

SOUTHBOUND ON RAMP AT NH ROUTE 11A/US ROUTE 3 INTERCHANGE

GILFORD, NH

NHDOT PROJECT NO. 41655

NH WETLANDS PERMIT APPLICATION

Submitted for:

NH DEPARTMENT OF TRANSPORTATION

Prepared by:

GM2 ASSOCIATES

Concord, NH

NOVEMBER 2018

CULVERT REHABILITATION

SOUTHBOUND ON RAMP AT NH ROUTE 11A/US ROUTE 3 INTERCHANGE

GILFORD, NH

NHDOT PROJECT NO. 41655

TABLE OF CONTENTS

NHDES-W-06-012

WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau
Land Resources Management

Check the status of your application: www.des.nh.gov/onestop

RSA/Rule: RSA 482-A/ Env-Wt 100-900

Administrative Use Only	Administrative Use Only	Administrative Use Only	File No.
			Check No.
			Amount:
			Initials:

1. REVIEW TIME: Indicate your Review Time below. To determine review time, refer to Guidance Document A for instructions.

☒ Standard Review (Minimum, Minor or Major Impact) ☐ Expedited Review (Minimum Impact only)

2. MITIGATION REQUIREMENT:

If mitigation is required a Mitigation-Pre Application meeting must occur prior to submitting this Wetlands Permit Application. To determine if Mitigation is Required, please refer to the Determine if Mitigation is Required Frequently Asked Question.

Mitigation Pre-Application Meeting Date: Month: __ Day: __ Year: ____

☒ N/A - Mitigation is not required

3. PROJECT LOCATION:

Separate wetland permit applications must be submitted for each municipality that wetland impacts occur within.

ADDRESS: **Southbound On Ramp at NH Route 11A/US Route 3 Interchange**		TOWN/CITY: **Gilford**	
TAX MAP: **N/A**	BLOCK: **N/A**	LOT: **N/A**	UNIT: **N/A**
USGS TOPO MAP WATERBODY NAME: **unnamed trib. to Jewett Brook** ☐ NA		STREAM WATERSHED SIZE: **858 ac.** ☐ NA	
LOCATION COORDINATES (If known): **43.531 N, 71.443 W**		☒ Latitude/Longitude ☐ UTM ☐ State Plane	

4. PROJECT DESCRIPTION:

Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

The project involves the rehabilitation of an existing 84" culvert that carries an unnamed tributary to Jewett Brook under the Southbound On Ramp at the NH Route 11A/US Route 3 Interchange. The existing pipe will be lined with a metal structural plate liner (tunnel liner plate). A new concrete headwall will be constructed on the inlet end and one slope drain near the outlet will be replaced. A detailed project description is attached.

5. SHORELINE FRONTAGE:

☒ NA This does not have shoreline frontage. SHORELINE FRONTAGE:

Shoreline frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line.

6. RELATED NHDES LAND RESOURCES MANAGEMENT PERMIT APPLICATIONS ASSOCIATED WITH THIS PROJECT:

Please indicate if any of the following permit applications are required and, if required, the status of the application.

To determine if other Land Resources Management Permits are required, refer to the Land Resources Management Web Page.

Permit Type	Permit Required	File Number	Permit Application Status
Alteration of Terrain Permit Per RSA 485-A:17	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED
Individual Sewerage Disposal per RSA 485-A:2	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED
Subdivision Approval Per RSA 485-A	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED
Shoreland Permit Per RSA 483-B	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED

7. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:

See the Instructions & Required Attachments document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID: NHB **18** - **2432** .

b. ☐ Designated River the project is in ¼ miles of: _____ ; and
date a copy of the application was sent to the Local River Management Advisory Committee: Month: __ Day: __ Year: ____
☒ N/A

8. APPLICANT INFORMATION (Desired permit holder)

LAST NAME, FIRST NAME, M.I.: **NH Dept. of Transportation**			
TRUST / COMPANY NAME: **NH Dept. of Transportation**	MAILING ADDRESS: **PO Box 483**		
TOWN/CITY: **Concord**		STATE: **NH**	ZIP CODE: **03302**
EMAIL or FAX: **Bureau16@dot.nh.gov**	PHONE: **603-271-3226**		

ELECTRONIC COMMUNICATION: By initialing here: KOM, I hereby authorize NHDES to communicate all matters relative to this application electronically.

9. PROPERTY OWNER INFORMATION (If different than applicant)

LAST NAME, FIRST NAME, M.I.: **same as applicant**			
TRUST / COMPANY NAME:	MAILING ADDRESS:		
TOWN/CITY:		STATE:	ZIP CODE:
EMAIL or FAX:	PHONE:		

ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.

10. AUTHORIZED AGENT INFORMATION

LAST NAME, FIRST NAME, M.I.: **Riordan, Jennifer**	COMPANY NAME: **GM2 Associates, Inc.**		
MAILING ADDRESS: **197 Loudon Road, Suite 310**			
TOWN/CITY: **Concord**		STATE: **NH**	ZIP CODE: **03301**
EMAIL or FAX: **jriordan@gm2inc.com**	PHONE: **603-856-7854**		

ELECTRONIC COMMUNICATION: By initialing here **JMR**, I hereby authorize NHDES to communicate all matters relative to this application electronically.

11. PROPERTY OWNER SIGNATURE:
See the Instructions & Required Attachments document for clarification of the below statements

By signing the application, I am certifying that:

1. I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application.
2. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document.
3. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.
4. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.
5. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.
6. Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47.
7. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for NHPA 106 compliance.
8. I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project.
9. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.
10. I understand that the willful submission of falsified or misrepresented information to the New Hampshire Department of Environmental Services is a criminal act, which may result in legal action.
11. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.
12. The mailing addresses I have provided are up to date and appropriate for receipt of NHDES correspondence. NHDES will not forward returned mail.

Property Owner Signature	Print name legibly	Date
	KIRK MUDGETT	11/21/18

MUNICIPAL SIGNATURES

12. CONSERVATION COMMISSION SIGNATURE

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.

⇨	Print name **legibly**	Date

DIRECTIONS FOR CONSERVATION COMMISSION

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will be reviewed in the standard review time frame.

13. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.

⇨ Town/City Clerk Signature	Print name legibly	Town/City	Date

DIRECTIONS FOR TOWN/CITY CLERK:

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
4. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery.

14. IMPACT AREA:

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact

Permanent: impacts that will remain after the project is complete.

Temporary: impacts not intended to remain (and will be restored to pre-construction conditions) after the project is complete.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.		TEMPORARY Sq. Ft. / Lin. Ft.	
Forested wetland		☐ ATF	1,243	☐ ATF
Scrub-shrub wetland		☐ ATF	1,296	☐ ATF
Emergent wetland		☐ ATF	345	☐ ATF
Wet meadow		☐ ATF		☐ ATF
Intermittent stream		☐ ATF		☐ ATF
Perennial Stream / River	174 / 29	☐ ATF	178 / 23	☐ ATF
Lake / Pond	/	☐ ATF	/	☐ ATF
Bank - Intermittent stream	/	☐ ATF	/	☐ ATF
Bank - Perennial stream / River	331 / 46	☐ ATF	693 / 95	☐ ATF
Bank - Lake / Pond	/	☐ ATF	/	☐ ATF
Tidal water	/	☐ ATF	/	☐ ATF
Salt marsh		☐ ATF		☐ ATF
Sand dune		☐ ATF		☐ ATF
Prime wetland		☐ ATF		☐ ATF
Prime wetland buffer		☐ ATF		☐ ATF
Undeveloped Tidal Buffer Zone (TBZ)		☐ ATF		☐ ATF
Previously-developed upland in TBZ		☐ ATF		☐ ATF
Docking - Lake / Pond		☐ ATF		☐ ATF
Docking - River		☐ ATF		☐ ATF
Docking - Tidal Water		☐ ATF		☐ ATF
Vernal Pool		☐ ATF		☐ ATF
TOTAL	505 / 75		3,755 / 118	

15. APPLICATION FEE: See the Instructions & Required Attachments document for further instruction

☐ Minimum Impact Fee: Flat fee of $ 200

☒ Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking) **4,260** sq. ft. X $0.20 = **$ 852.00**

Temporary (seasonal) docking structure: _____ sq. ft. X $1.00 = $ _____

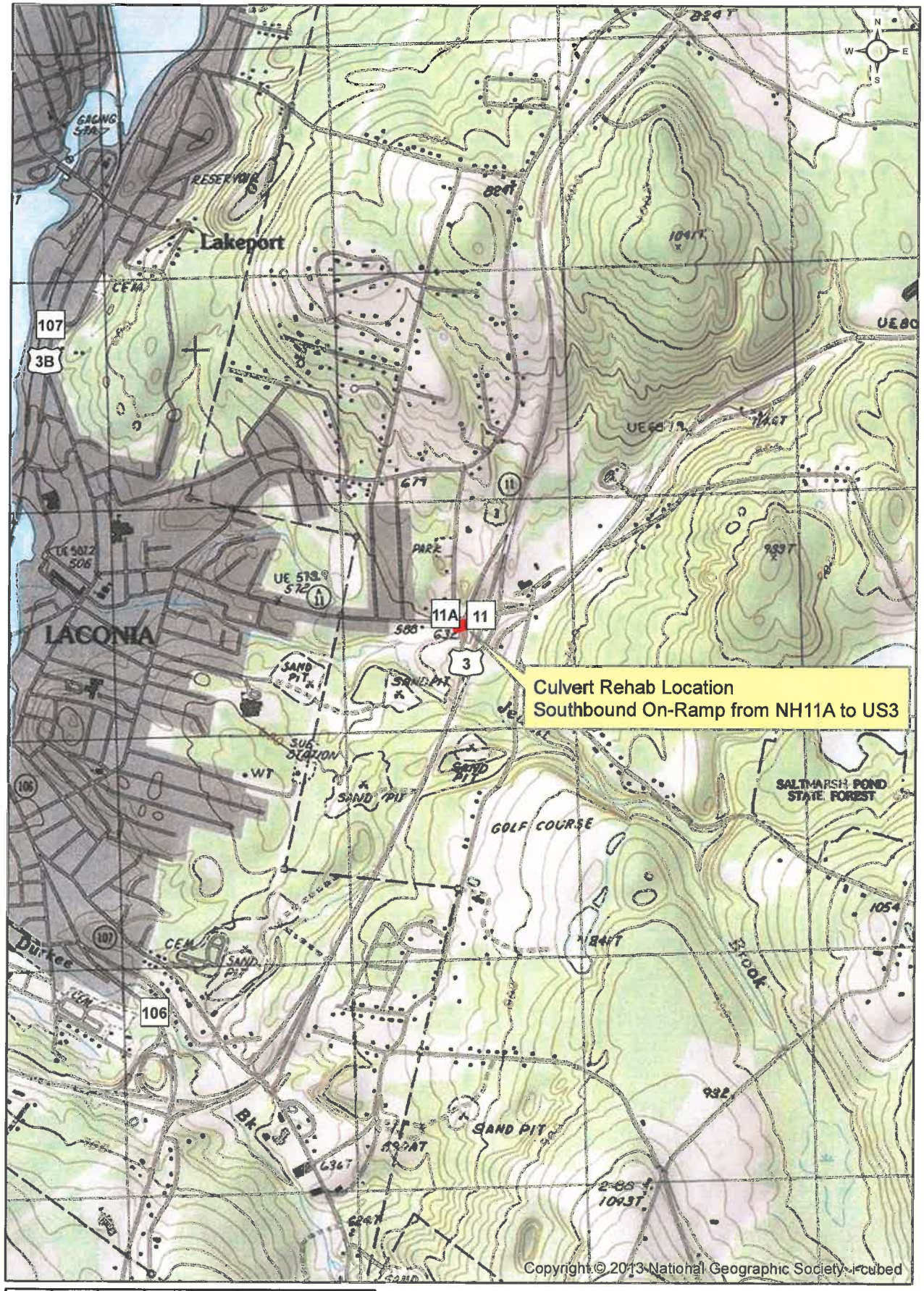
Permanent docking structure: _____ sq. ft. X $2.00 = $ _____

Projects proposing shoreline structures (including docks) add $200 = $ _____

Total = **$ 852.00**

The Application Fee is the above calculated Total or $200, whichever is greater = **$ 852.00**

Gilford 41655 Topographic Location Map



CULVERT REHABILITATION
SOUTHBOUND ON RAMP AT NH ROUTE 11A/US ROUTE 3 INTERCHANGE
GILFORD, NH
NHDOT PROJECT NO. 41655

SUPPLEMENTAL NARRATIVE

Project Description

The project involves the rehabilitation of an existing 84" culvert that carries an unnamed tributary to Jewett Brook under the Southbound On Ramp at the NH Route 11A/US Route 3 Interchange in Gilford. The existing pipe will be lined with a metal structural plate liner (tunnel liner plate). The project is funded under the Federal Culvert Rehabilitation Program.
All work will be within the existing ROW.

The proposed tunnel liner plate will be constructed inside the existing pipe. This will result in a slight reduction in pipe diameter from 84" to 76". At the outlet, the liner will be approximately 2" above the existing invert and at the inlet it will be approximately 5" below existing. This will reduce the culvert slope from 1.9% to 1.3%.

At the outlet, the mitered end will be left in place and repaired with concrete. At the inlet, the existing pipe will be cut back approximately 18 feet, from the existing invert. The liner will be extended approximately 6 feet beyond the cut pipe and a new concrete headwall will be constructed. Overall, this will shorten the pipe from 132 feet to 120 feet, creating approximately 12 feet of open stream channel at the inlet. Existing stone at the inlet and outlet will be reset to match the new pipe inverts.

The proposed culvert length is slightly different than what was presented at the August 15, 2018 Natural Resource Agency Meeting. The project, as originally proposed at the Natural Resource Agency Meeting, included removing the mitered end and approximately 10 feet of pipe but not extending the liner past the cut pipe. This would have shortened the pipe from 132 feet to 114 feet, creating approximately 18 feet of open stream channel. The project design was changed since it was determined that shortening the pipe by 18 feet would substantially increase project cost (from approximately $275,000 to approximately $400,000). The increased cost is due to the additional roadway embankment excavation required and the additional reinforced concrete required to construct a larger headwall and wingwalls. As a result, the project was revised to balance both cost and wetland impact. As currently proposed, the culvert will be shortened to create approximately 12 feet of open stream channel, compared to the originally-proposed 18 feet. Replacement of one 12" corrugated metal slope drain near the culvert outlet was added to the scope of work. Replacement will be 12" corrugated plastic, at the same location and elevation.

Since the work area is located away from the roadway, no road closures or other significant impacts to traffic are anticipated to be necessary. Temporary construction access roads will be required from NH Route 11A to the inlet and outlet sides. Project duration is anticipated to be 8 to 10 weeks.

The project will not involve any changes in impervious surface, with the exception of a very minor increase resulting from the addition of a new headwall at the culvert inlet. Excavation and grading will be limited to the areas near the inlet and outlet and will be associated with reshaping the stream banks and channel to match the rehabilitated culvert.

Temporary wetland impacts will result from the construction access roads, slope drain replacement, and resetting of existing stone along the stream banks. Where access roads cross wetlands, the Contractor will be required to use temporary protective measures such as crushed stone on geotextile to minimize disturbance to the soil and plant root systems. Wetland vegetation will be allowed to re-establish naturally.

Existing Conditions

The existing culvert is 84" in diameter and 132 feet long and was constructed in 1964. The culvert slope is approximately 1.9% with about 20 feet of cover and has mitered ends. There is severe corrosion along the invert, substantial portions of missing invert, and some changes in shape. A sinkhole is forming above the inlet end.

The area surrounding the project includes US Route 3, NH Route 11A, and several on and off ramps, as well as mowed field, forested wetland and upland, and emergent and scrub-shrub wetlands. Several businesses are also located in the vicinity of the project. A small, unnamed perennial stream flows through the 84" culvert and enters Jewett Brook approximately 1,000 feet west of the project. Upstream of the project, this stream passes through several culverts under US Route 3, NH Route 11A, and Sawmill Road.

The drainage area for the 84" culvert to be rehabilitated is approximately 858 acres (according to USGS StreamStats) so the crossing is classified as Tier 3.

There are no reports of flooding or damage associated with this crossing.

Streambank Stabilization and Restoration

Existing streambanks are heavily armored. Stones that are moved during construction will be reset once construction is complete. The segment of created stream channel (approximately 12 linear feet on the inlet side) will be graded to mimic the natural stream channel and similar stones will be placed to stabilize the channel and banks. Seeding and mulching will be used as necessary to establish a vegetative cover on disturbed areas above top of bank.

Hydraulic Analysis

Hydraulic analyses of the existing conditions (84" corrugated metal pipe) and the proposed design (76" structural plate liner with headwall and 45° wingwalls) were conducted to ensure that the conveyance and hydraulic conductivity of the stream crossing is adequate during significant rainfall events. Design flows are based on StreamStats flow estimates.

The existing culvert can pass the Q100 flow (328 cfs) with a headwater depth of approximately 8.2'. The rehabilitated culvert will pass the Q100 flow without adverse effect on roadways or upstream development. Improved inlet conditions will help keep the increase in headwater from the smaller diameter liner to a minimum. The raise in the Q100 headwater depth is predicted to be approximately 13" but impacts are not anticipated due to the height of the surrounding roadway fill (Headwater depth for overtopping of NH Route 11A is approximately 25 feet). Areas subject to increased headwater are all within the existing ROW.

The overall length of the culvert will be reduced to from 132 feet to 120 feet. The inlet and outlet inverts will be lowered approximately five inches and raised approximately two inches, respectively, and a concrete headwall with 45° wingwalls and beveled inlet edge will be constructed at the inlet. Lowering the inlet invert elevation is necessary to provide clearance from the top of the new liner to the top of existing pipe, which is beginning to collapse. Reducing the culvert slope from 1.9% to approximately 1.3% will help keep the increase in outlet velocity from the slightly smoother, smaller diameter liner to a minimum. The Q100 outlet velocity will increase slightly from 11.75 ft/s to 13 ft/s. Although the outlet velocity will increase, additional channel erosion is unlikely because the outlet channel is well protected with existing large stones and rock.

Concurrent Work

Rehabilitation of the next two 84" pipes immediately upstream is proposed under Project 42249. If funding is available, Project 42249 will be advertised and constructed concurrently with this project. A separate Wetland Permit Application will be submitted for the 42249 Project.

WETLANDS PERMIT APPLICATION – ATTACHMENT A
MINOR AND MAJOR - 20 QUESTIONS

Land Resources Management
Wetlands Bureau

Check the Status of your application: www.des.nh.gov/onestop

RSA/ Rule: RSA 482-A, Env-Wt 100-900

Env-Wt 302.04 Requirements for Application Evaluation - For any major or minor project, the applicant shall demonstrate by plan and example that the following factors have been considered in the project's design in assessing the impact of the proposed project to areas and environments under the department's jurisdiction. Respond with statements demonstrating:

1. The need for the proposed impact.

The project is needed to address the deteriorated condition of an existing 84" culvert. The culvert was constructed in 1964 and has severe corrosion along the invert and substantial portions of missing invert. The culvert is also changing shape, which indicates that it may be starting to collapse. In addition, there is a sinkhole forming above the inlet end.

2. That the alternative proposed by the applicant is the one with the least impact to wetlands or surface waters on site.

The following project alternatives were considered:

- Rehabilitation of the existing pipe (proposed action)

- In-Kind Replacement - This alternative would involve substantial excavation (3,000 to 5,000 cubic yards and a depth of at least 27 feet) along with reconstruction and closure of the on ramp. This would involve more wetland impact and more ground disturbance during construction compared to the proposed pipe rehabilitation. Post-construction conditions would be similar to existing conditions, with no improvements to the stream crossing.

- Replacement with an embedded box culvert - Similar to in-kind replacement, this alternative would also involve a large amount of excavation, which would cause temporary impacts to the stream and adjacent wetlands during construction. In order to fully address the stream crossing rules, a culvert/bridge span of around 19 feet would be required. This would involve a substantial amount of disturbance to the on ramp and roadway embankment and is not considered to be a feasible alternative due to cost and traffic impacts. Although this alternative would result in an improvement to the stream crossing, it is not a financially viable option.

3. The type and classification of the wetlands involved.

The wetland resources that will be impacted include an unnamed tributary to Jewett Brook and its adjacent wetlands, which are classified as:

- Unnamed tributary - R2UB1 (riverine, lower perennial, unconsolidated bottom, cobble-gravel) - includes stream channel and banks

- Adjacent wetlands on east side of on ramp - PEM1E (palustrine, emergent, persistent, seasonally flooded/saturated) and PSS1E (palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded/saturated)

- Adjacent wetlands on west side of ramp - PFO1E (palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated)

4. The relationship of the proposed wetlands to be impacted relative to nearby wetlands and surface waters.

Impacts include the banks and channel of an unnamed perennial tributary to Jewett Brook and adjacent wetland areas. The unnamed tributary flows west from the culvert crossing and enters Jewett Brook approximately 1,000 feet west of the project.

5. The rarity of the wetland, surface water, sand dunes, or tidal buffer zone area.

The wetlands and stream within the project area are typical of the region and are not considered to be rare.

6. The surface area of the wetlands that will be impacted.

Total wetland impacts include approximately 505 SF of permanent impacts and 3,755 SF of temporary impacts. A detailed breakdown of the impacts includes:

- **Permanent perennial stream impact = 174 SF**
- **Permanent bank impact = 331 SF**
- **Temporary wetland impact = 2,884 SF**
- **Temporary perennial stream impact = 178 SF**
- **Temporary bank impact = 693 SF**

The permanent impacts to the stream channel and banks are for grading at the inlet to match the new invert and reshaping the banks to match the new headwall. Temporary impacts are proposed for resetting existing stone at the outlet, construction access, staging, and water diversion. As per discussion at the August 15, 2018 NHDOT Natural Resource Agency meeting, work within the existing pipe has not been included as channel impact.

7. The impact on plants, fish and wildlife including, but not limited to:
   a. Rare, special concern species;
   b. State and federally listed threatened and endangered species;
   c. Species at the extremities of their ranges;
   d. Migratory fish and wildlife;
   e. Exemplary natural communities identified by the DRED-NHB; and
   f. Vernal pools.

a. According to information received from the NH Natural Heritage Bureau, the project is not anticipated to result in impacts to rare or special concern species.

b. Federally-listed species noted in the IPaC report included northern long-eared bat (NLEB) and small whorled pogonia. The project was reviewed under the revised February 5, 2018 FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) and was determined to "may affect and is likely to adversely affect" NLEB. A consistency letter for the project was received on October 25, 2018 (enclosed). Concurrence from USFWS is pending. A review of small whorled pogonia records indicated that there are no known records in Gilford, so no impacts to this species are anticipated. A "No Species Present" letter for small whorled pogonia is included with this application.

Information received from the NH Natural Heritage Bureau indicated that no impacts to state-listed species are anticipated.

c. There are no known species at the extremities of their range within the vicnity of the project.

d. The project is not expected to impact migratory fish and wildlife. Jewett Brook is not identified as Essential Fish Habitat for Atlantic salmon.

e. According to information received from the NH Natural Heritage Bureau, the project is not anticipated to result in impacts to exemplary natural communities.

f. There are no vernal pools within the project area.

8. The impact of the proposed project on public commerce, navigation and recreation.

The project will not impact public commerce, navigation, or recreation. The stream within the project area is not large enough to be used for public commerce or navigation. No road closures are anticipated to be required during construction.

The project area is not used for recreation since it is located along an on ramp for the US Route 3/NH Route 11A interchange. Best Management Practices (BMPs) will be used during construction to minimize any downstream water quality impacts that could affect recreational use along Jewett Brook.

9. The extent to which a project interferes with the aesthetic interests of the general public. For example, where an applicant proposes the construction of a retaining wall on the bank of a lake, the applicant shall be required to indicate the type of material to be used and the effect of the construction of the wall on the view of other users of the lake.

The proposed culvert rehabilitation will not interfere with the aesthetic interests of the general public. Post construction conditions will be similar to existing conditions and no adverse visual impacts are anticipated.

Some vegetation clearing (approximately 3,000 SF) will be required for construction access and staging at the culvert inlet and outlet. This will result in temporary visual impact. Areas impacted by the construction access routes will be restored once construction is completed and vegetation will be allowed to re-establish.

10. The extent to which a project interferes with or obstructs public rights of passage or access. For example, where the applicant proposes to construct a dock in a narrow channel, the applicant shall be required to document the extent to which the dock would block or interfere with the passage through this area.

The project will not interfere with or obstruct public rights of passage or access. No permanent changes to the US Route 3/NH Route 11A interchange are proposed and the project will not change traffic patterns. No road closures are anticipated to be required during construction. The project will not result in any changes to the culvert that would impact access along the stream.

11. The impact upon abutting owners pursuant to RSA 482-A:11, II. For example, if an applicant is proposing to rip-rap a stream, the applicant shall be required to document the effect of such work on upstream and downstream abutting properties.

The proposed culvert rehabilitation will involve lining the existing pipe, which will reduce the diameter from 84" to 76". This will result in a slight increase in outlet velocity (100-year storm will increase from around 11.75 feet/second to 13 feet/second). Even with the smaller diameter, the rehabilitated culvert is expected to pass flow from the 100-year storm without adverse effect on roadways or upstream development. The raise in the 100-year storm headwater depth is predicted to be approximately 13" but impacts are not anticipated due to the height of the surrounding roadway fill (25+ feet).

12. The benefit of a project to the health, safety, and well being of the general public.

The project will improve safety by repairing a deteriorating culvert on a public road. The existing culvert currently has severe corrosion along the invert and substantial portions of missing invert. The culvert is also changing shape, which indicates that it may be starting to collapse. In addition, there is a sinkhole forming above the inlet end. Rehabiliting the culvert will address these deficiencies.

13. The impact of a proposed project on quantity or quality of surface and ground water. For example, where an applicant proposes to fill wetlands the applicant shall be required to document the impact of the proposed fill on the amount of drainage entering the site versus the amount of drainage exiting the site and the difference in the quality of water entering and exiting the site.

The project will not result in any changes in impervious surface, so no changes in the quantity or quality of stormwater runoff are anticipated. Permanent wetland impacts are limited to the areas around the inlet and outlet and are associated with matching the new inverts and reshaping the stone-lined banks. No drainage changes are proposed, with the exception of narrowing the existing pipe from 84" to 76" in diameter and shortening the pipe length from 132 feet to 120 feet. This will result in a slight increase in outlet velocity, however no downstream impacts are anticipated since the channel is currently armored with stone and erosion is not anticipated to be an issue.

An existing slope drain located west of the Southbound On Ramp will be replaced. This will not have any impact on surface or groundwater within the project area.

Temporary impacts to water quality during construction will be minimized through the use of erosion and sedimentation controls.

14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.

As discussed above, lining the pipe will decrease the diameter from 84" to 76". This will result in a slight increase in outlet velocity, however no downstream impacts are anticipated since the channel is currently armored with stone and erosion is not anticipated to be an issue. The anticipated increase for the 100-year storm is approximately 1.25 feet/second (11.75 feet/second to 13 feet/second).

No flooding impacts are anticipated. The rehabilitated culvert is expected to pass flow from the 100-year storm without adverse effect on roadways or upstream development. The raise in the 100-year storm headwater depth is predicted to be approximately 13" but impacts are not anticipated due to the height of the surrounding roadway fill (25+ feet).

15. The extent to which a project that is located in surface waters reflects or redirects current or wave energy which might cause damage or hazards.

N/A - The stream within the project area is relatively small and the project is not expected to alter current or wave energy.

16. The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland or wetland complex were also permitted alterations to the wetland proportional to the extent of their property rights. For example, an applicant who owns only a portion of a wetland shall document the applicant's percentage of ownership of that wetland and the percentage of that ownership that would be impacted.

Since the project involves the rehabilitation of an existing culvert, wetland and stream impacts are limited to small areas on each end of the culvert, as well as temporary impacts required for construction access. Cummulative impacts that would result from abutting property owners would likely not be substantial if the abutters' impacts were also limited to the rehabilitation of existing structures and were relatively small in nature.

17. The impact of the proposed project on the values and functions of the total wetland or wetland complex.

Since the project involves the rehabilitation of an existing culvert, no substantial impacts to the values and functions of the stream and wetland complex are anticipated. Permanent impacts will be limited to the areas around the culvert's inlet and outlet. Temporary impacts associated with construction access, staging, and water diversion will be restored once construction is complete.

The diameter of the culvert will be reduced from 84" to 76" and the length will be reduced by approximately 12 feet. These changes are not expected to signficantly alter stream flow or flooding within the stream channel and wetland complex. Flood storage functions provided by the wetland complex will not be affected since only a minor amount of fill within wetlands is proposed. The wetland complex, as a whole, will still be able to provide this function at a level similar to pre-construction conditions.

Temporary disturbance to wildlife and fisheries habitat may occur during construction as a result of clearing vegetation, diverting the stream, and operating construction equipment.

No changes in the wetland complex's ability to provide sediment retention and stabilization are anticipated, except for the removal of vegetation for construction access and staging. Stream banks that are disturbed during the culvert rehabilitation work will be reconstructed once work is complete. Areas of open soil will be stabilized either with stone or seed/mulch.

18. The impact upon the value of the sites included in the latest published edition of the National Register of Natural Landmarks, or sites eligible for such publication.

N/A - No such sites are located near the project.

19. The impact upon the value of areas named in acts of congress or presidential proclamations as national rivers, national wilderness areas, national lakeshores, and such areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.

N/A - No such areas are located near the project.

20. The degree to which a project redirects water from one watershed to another.

The project is located entirely within the watershed of the unnamed tributary to Jewett Brook and will not redirect water from one watershed to another.

Additional comments

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: August 15, 2018
LOCATION OF CONFERENCE: John O. Morton Building
ATTENDED BY:

NHDOT
Sarah Large
Ron Crickard
Mark Hemmerlein
Brian Lombard
Meli Dube
Nancy Spaulding
Kirk Mudgett
Ron Kleiner
Chris Carucci
Bob Landry
Jennifer Reczek
Marc Laurin
Samantha Fifield
Kevin Nyhan
Bob Hudson
Maggie Baldwin

ACOE
Mike Hicks

NHDES
Gino Infascelli
Lori Sommer

NHF&G
Carol Henderson

NHB
Amy Lamb

Consultants/Public Participants
Mike Croteau
Sean Sweeney
Jennifer Riordan
Brent Williams
Christine Perron
Brian Colburn
Darren Benoit
Jim Murphy
Stephanie Dyer-Carroll
Dan Hageman
Johanna Lyons
Eric Feldbaum

(When viewing these minutes online, click on an attendee to send an e-mail)

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH: *(minutes on subsequent pages)*

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

C. Henderson asked if the roadway has ever flooded. N. Spaulding indicated that the water has never overtopped the road at the crossing but that the road has been flooded to the north near the golf course up that way.

M. Hicks asked how old the pipes were. N. Spaulding indicated that she thought that the roadway was last improved in the 50s / early 60s. They have been there over 50s years.

Amy Lamb indicated that there is a rare plant species growing along the shoreline of the lake near the culvert: coastal plain grass-leaved goldenrod (*Euthamia caroliniana*). This species was previously surveyed at the site to assess for potential impacts from the proposed replacement of the concrete pipes. At the time, NHB had no concerns. Since DES has requested that the design be revised to address the Stream Crossing Rules, NHB requests that this species be considered and factored into the new design to reduce the risk of impacts.
N. Spaulding advised that when they come back she will advise what the timeline of projects are for the culvert improvement program area and where this would fall in.

This project has not been previously discussed at the Monthly Natural Resource Agency Coordination Meeting.

Gilford, #41655 (X-A004(710))
Chris Carucci gave an overview of the project, which involves the rehabilitation of an existing culvert that carries an unnamed perennial tributary to Jewett Brook under the US Route 3 Bypass Southbound On Ramp from NH Route 11A. The project is funded under the Federal Culvert Rehabilitation Program. The proposed advertising date is November 27, 2018, with construction anticipated in the summer of 2019. There are two 84" pipes just upstream that are in the process of being added to the culvert rehabilitation program but no further information is currently available.

The existing culvert is 84" in diameter and 132 feet long and was constructed in 1964. The culvert slope is approximately 1.9% with about 20 feet of cover and has mitered ends. There is severe corrosion along the invert, substantial portions of missing invert, and some changes in shape. A sinkhole is forming above the inlet end.

The culvert has performed well for over 50 years, with no reports of flooding or damage. The USGS StreamStats drainage area is 1.34 square miles (857.6 acres). As a result, the stream crossing is classified as Tier 3.

Design flows will be based on StreamStats Q100 of 328 cfs. Headwater depth required to pass the Q100 is around 8.2'. The inlet area is contained within the roadway slopes and there is no bypass. The headwater would eventually backup through existing pipes and overtop Route 11A, however the road is over 25 feet above the pipe invert.

Project alternatives considered included culvert rehabilitation, replacement in-kind, and replacement with an 8' wide by 7' high embedded box culvert. Based on NH Regional Curves, the bankfull width should be around 14', suggesting a span of about 19'.

Rehabilitation is the preferred option due to the height of fill. Replacing in-kind or with a larger structure by open cut would involve an excavation depth of at least 27', removal and reconstruction of about 200 linear feet of ramp, 3,000 to 5,000 cubic yards of excavation, and closure of the ramp for at least a month.

Ramp traffic volume is approximately 3,000 vehicles per day. Detour length via state routes would be about 6 miles.

Cost estimates for the alternatives are $850,000 for an 8'x7' box culvert, $560,000 for replacement in-kind, and $275,000 for rehabilitation.

The proposed rehabilitation is a metal structural plate liner (known as a tunnel liner plate). This liner is constructed from inside the existing pipe. This allows work to proceed from inside the completed rings. When complete, the annular space is filled with grout. Another benefit of this method is that it can accommodate low flows being pumped through the existing pipe and storm flow if necessary. The liner will be approximately 76" in diameter (slight reduction in diameter, from 84"). At the outlet, the liner will be approximately 2" above the existing invert and at the inlet it will be approximately 5" below existing. This will reduce the culvert slope from 1.9% to 1.3%.

At the outlet, the mitered end will be left in place and repaired with concrete. At the inlet, the mitered end and about 10' of pipe will be removed and a new concrete headwall will be constructed. This will shorten the pipe from 132' to 114'. Temporary access roads will be required from NH Route 11A to the inlet and outlet sides. Existing stone at the inlet and outlet will be reset to match the new pipe inverts.

The rehabilitated culvert will pass the Q100 flow without adverse effect on roadways or upstream development. The raise in the Q100 headwater depth is predicted to be around 12" but impacts are not anticipated due to the height of the surrounding roadway fill.

Estimated wetland impacts are as follows:

- Inlet side
    - Permanent bank impacts – 80 SF each side (to reshape existing stone-lined banks)
    - Temporary wetland impacts – 2,000 SF
- Outlet side
    - Permanent channel impacts – 25 SF (to match new invert)
    - Temporary wetland impacts – 2,000 SF

In total, wetland impacts are anticipated to include approximately 105 SF of permanent impact and 4,000 SF of temporary impact. Linear footage of permanent perennial stream impact is estimated at 10 LF of channel and 25 LF of bank.

Meli Dube asked how the impacts inside the existing pipe should be accounted for in the wetland permit application and whether mitigation is required. Gino Infascelli replied that these impacts don't need to be included in the application since this portion of the stream channel is located within the existing pipe and has already been impacted. Lori Sommer confirmed that mitigation is not required since channel is being created by shortening the pipe.

Carol Henderson asked if there are any impacts to wildlife connectivity and if the existing culvert is perched. Meli and Chris responded that the culvert is not perched and no impacts are anticipated.

Some tree and shrub clearing will be required for construction. Meli will complete the appropriate coordination for northern-long eared bat. The USFWS IPaC report also listed small whorled pogonia, however upon closer inspection, there are no records in Gilford so no effects are anticipated. There were no concerns in NH Natural Heritage Bureau's report.

Gino stated that the stream crossing rules still need to be addressed. The amount of cover is an issue for culvert replacement, so the project can be reviewed as an alternative design.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

Lebanon-Hartford, #16148 (A001(154))

This project involves the rehabilitation and widening of the Interstate 89 bridges over the Connecticut River between Lebanon, NH and Hartford, VT. The project was last reviewed at this meeting in February 2017. The purpose of today's meeting is to review proposed impacts and mitigation once more before permit applications are submitted.

Brian Colburn provided an overview of the project. The existing superstructure steel will be replaced with new steel and an in-fill will be constructed in the gap between the bridges to provide a single 110'+/- wide bridge deck to facilitate traffic control. The in-fill will require new footings between each of the five pairs of existing piers, four of which are located in the river. The resulting bridge will allow for maintenance of traffic during phased construction. Following construction, the bridge will provide two through lanes in each direction and auxiliary lanes between Exit 20 and I-91 ramps.

Three stormwater treatment areas will be constructed to treat runoff. Work as proposed will result in a net increase of approximately 0.9 acres of impervious surface in New Hampshire and 0.5 acres in Vermont. A proposed treatment swale and infiltration basin in New Hampshire will treat runoff from approximately 2.82 acres of pavement. An infiltration basin proposed in Vermont will collect and treat runoff from approximately 2.04 acres of pavement. For the overall project, there would be approximately 4.86 acres of pavement treated, compared with an increase of 1.4 acres of new impervious surface.

Two piers require scour protection. The first, easternmost pier does not experience scour and the fourth, westernmost pier in the river is located on bedrock; therefore, these two piers do not need scour protection. A-Jacks concrete armor units are proposed for the two piers in the center of the river. Mats of these interlocking units would be constructed on land or a barge and then lowered by crane to the river bottom around each pier. The mats would be placed on top of the channel substrate. Since no excavation or placement of bedding materials will be required for the A-Jacks, the use of cofferdams will be limited to the footprint of the new pier footings. The existing piers have been experiencing scour, and scour protection would be necessary even if new footings were not proposed.

Due to the new piers and scour protection, the work as proposed would result in a slight increase in base flood elevation. Mitigation will be incorporated into the project to eliminate this increase. Proposed mitigation will entail benching into the VT bank to create a narrow shelf, staying approximately 1' above ordinary high water.

A work trestle across the full width of the Connecticut River will likely be needed for construction. To provide flexibility to the Contractor in locating the temporary construction trestle, a large footprint of temporary impact will be included in the permit application to accommodate an upstream or downstream trestle with extensions to the middle of the bridge to access each pier. This large footprint eliminates the need to show the location of every trestle pile. Actual temporary impacts within this large footprint would be limited to the trestle piles, which would total approximately 600 sq ft.

A temporary causeway/work platform would be needed off each bank of the river to provide a platform from which the trestle would be constructed. A small work platform will also be needed under the bridge

CULVERT REHABILITATION

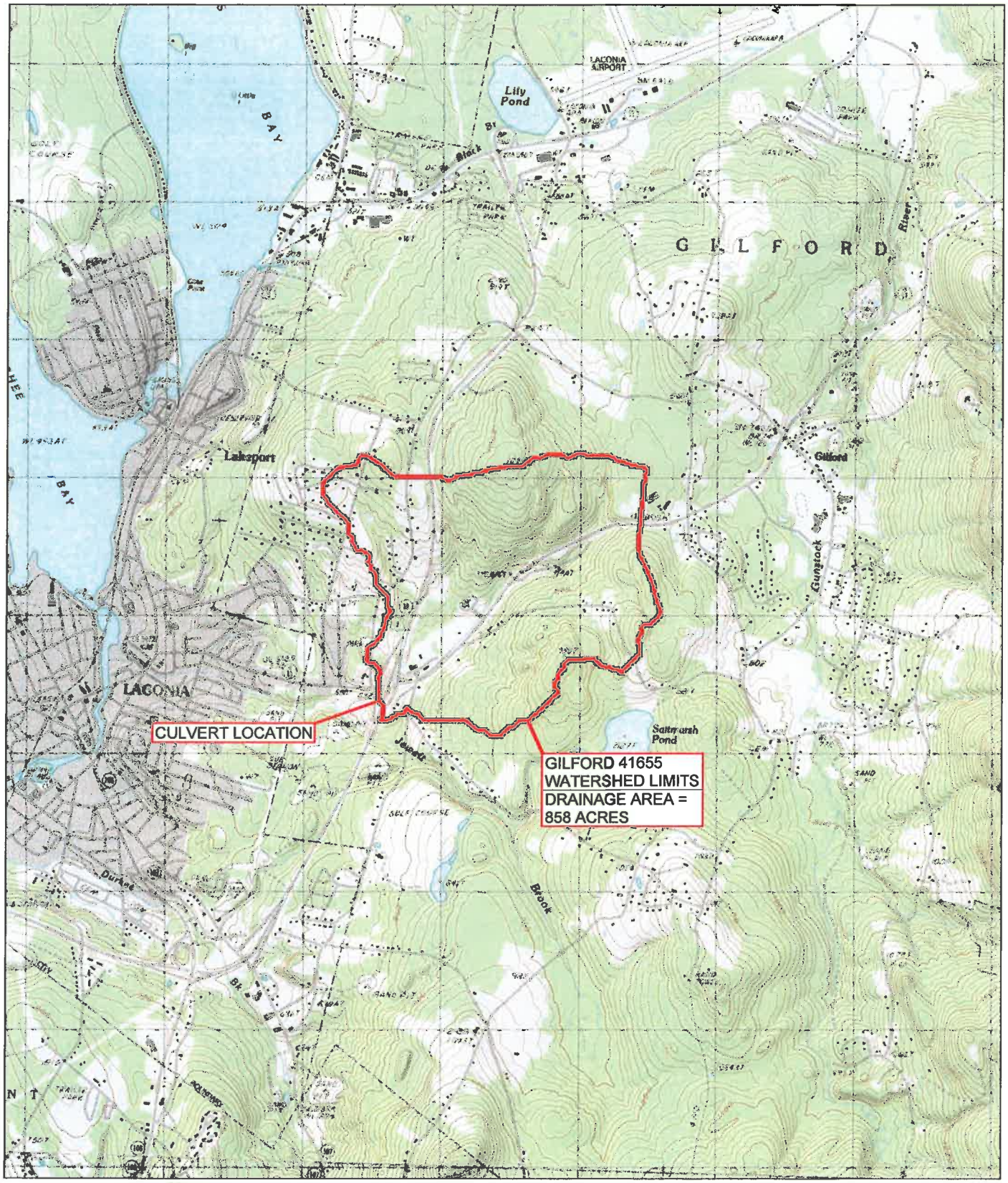
SOUTHBOUND ON RAMP AT NH ROUTE 11A/US ROUTE 3 INTERCHANGE

GILFORD, NH

NHDOT PROJECT NO. 41655

MITIGATION

Permanent impacts for the project include approximately 505 square feet of stream/bank impact and approximately 75 linear feet of stream impact (includes both banks and channel). Although the proposed wetland impact for the project is below the mitigation threshold of 10,000 square feet, the linear footage of stream impact exceeds the NHDES mitigation threshold. Project mitigation was discussed with NHDES at the August 15, 2018 Natural Resource Agency Coordination Meeting and it was determined that the project is self-mitigating since the culvert is being shortened and the mitered end on the inlet side will be removed. This will create approximately 12 linear feet of stream channel.


LACONIA AIRPORT
Lily Pond
BAY
GILFORD
Lakeport
Gilford
Gunstock River
LACONIA
CULVERT LOCATION
Saltmarsh Pond
GILFORD 41655
WATERSHED LIMITS
DRAINAGE AREA =
858 ACRES
Durkee Brook
N
0 1 Mi
0 5000 Ft

NH Department of Transportation
Bureau of Highway Design
Gilford, 41655
Env-Wt 904.09 Alternative Design
TECHNICAL REPORT

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.69 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.)*

In order to meet the requirements for a Tier 3 crossing, a replacement structure with a span of around 19 feet would be necessary. This is based on a bankfull width of approximately 14 feet. A structure of this size is not practicable due to the height of the fill above the existing pipe and the cost associated with construction. Replacing the existing pipe with a larger structure would involve an excavation depth of at least 27 feet and a volume of 3,000 to 5,000 cubic yards. In addition, approximately 200 linear feet of the on ramp would need to be removed and reconstructed, which would require closing the ramp for at least one month.

Costs were estimated for three different project alternatives. Rehabilitation of the existing pipe, which is proposed, is estimated to cost approximately $275,000. In-kind replacement of the pipe would cost approximately $560,000. Replacement of the existing culvert with an 8x7 foot embedded box culvert would cost approximately $850,000. The cost for replacing the existing pipe with a structure that has a 19-foot span was not estimated, however it would be expected to be greater than $850,000. Given the high cost and the impact to traffic from ramp closure during construction, replacement of the existing pipe with a larger structure was determined to not be practicable.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the *maximum extent practicable*, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.

As discussed above, replacing the existing pipe in accordance with the NH Stream Crossing Guidelines would require a new structure with a span of approximately 19 feet. This is based on a bankfull width of 14 feet (1.2 x bankfull width + 2). Replacing the existing pipe with a new structure was determined to not be practicable due to the amount of excavation required, the estimated cost, and the impacts to traffic during construction.

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.

The project will not substantially alter existing water depths and velocities within the culvert. Creating bed forms and streambed characteristics that mimic the natural stream channel is not practicable since the existing culvert is under a large amount of fill and replacement would involve a much higher cost compared to rehabilitation.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.

There are no vegetated banks within the existing structure since the culvert is not wide enough to span the banks. The banks located upstream and downstream of the pipe are armored with stone, although trees and shrubs are also present.

The establishment of vegetated banks within the rehabilitated culvert is not feasible since the structure will not be wide enough.

Vegetation clearing (approximately 3,000 square feet total) will be required on the upstream and downstream sides of the culvert for construction staging and access. Once construction is complete, the sections of bank that have been impacted during construction will be restored. This will involve reshaping the banks, replacing stones that have been moved, and seeding and/or installing other erosion control measures. Tree and shrub vegetation will be allowed to re-establish.

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.

The current alignment and gradient of the stream channel will not be altered by the project.

The natural alignment and gradient of the stream channel has likely been historically altered by the various road crossings in the project area. Two culvert crossings are located just upstream of the project area and the stream also crosses under several other roads further to the northeast.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability.

The rehabilitated culvert will accommodate the 100-year flood event. Lining the culvert will decrease the diameter from 84" to 76". This will raise the headwater depth for the 100-year storm by approximately 13". Headwater depth required to pass the 100-year storm through the rehabilitated culvert is approximately 9.3'. Impacts to upstream properties are not anticipated due to the height of the surrounding roadway fill. Headwater depth for the overtopping of NH Route 11A is approximately 25 feet. Areas subject to increased headwater are all within the existing ROW.

Reducing the pipe diameter will also result in a slight increase in outlet velocity, however no downstream impacts are anticipated since the channel is currently armored with stone and erosion is not anticipated to be a concern. The anticipated increase for the 100-year storm is approximately 1.25 feet/second (11.75 feet/second to 13 feet/second).

(f) To simulate a natural stream channel.

Due to the large amount of fill above the culvert and excavation/construction costs, it is not practicable to replace the existing pipe with a structure that spans the bankfull width and accommodates a more natural stream channel. The proposed project will shorten the existing pipe by approximately 12 feet (132 feet to 120 feet), which will create additional stream channel on the inlet (eastern) side of the culvert.

(g) So as not to alter sediment transport competence.

Reducing the culvert diameter will cause a slight increase in outlet velocity but the project is not expected to alter sediment transport competence since proposed conditions will be similar to existing conditions.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:

Env-Wt 904.01
(a) Not be a barrier to sediment transport;

The rehabilitated culvert will have a slightly smaller opening (84" to 76") but this reduction is not anticipated to result in a barrier to sediment transport. The existing culvert is level with the stream channel (not "perched") and the rehabilitated culvert is proposed to maintain this condition.

(b) Prevent the restriction of high flows and maintain existing low flows;

The rehabilitated culvert will continue to convey the 100-year storm event and will not restrict high flows. Low flows will be maintained since the stream channel will be graded to match the new inverts at the inlet and outlet. The culvert liner at the outlet will be approximately 2 inches above the existing invert. At the inlet, the proposed invert will be approximately 5 inches below the existing invert. This will reduce the slope of the culvert from 1.9% to 1.3%. This change in slope is not anticipated to impact low flows within the culvert.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

The existing culvert is level with the stream channel (not "perched") and the rehabilitated culvert is proposed to maintain this condition. The proposed metal liner will create a slightly smoother surface within the culvert, but the slight reduction in culvert slope (1.9% to 1.3%) may help to mitigate this.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;

Lining the culvert will reduce the diameter by approximately 8 inches. This will raise the headwater depth for the 100-year storm by approximately 13". Headwater depth required to pass the 100-year storm through the rehabilitated culvert is approximately 9.3'. Impacts to upstream properties are not anticipated due to the height of the surrounding roadway fill. Headwater depth for the overtopping of NH Route 11A is approximately 25 feet. As a result, rehabilitating the culvert is not anticipated to increase the frequency of flooding or the overtopping of banks.

(e) Preserve watercourse connectivity where it currently exists;

The existing watercourse connectivity within the project area will not be altered.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

N/A

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

As discussed above, lining the pipe will decrease the diameter from 84" to 76". This will result in a slight increase in outlet velocity, however no downstream impacts are anticipated since the channel is currently armored with stone and erosion is not anticipated to be an issue. The anticipated increase for the 100-year storm is approximately 1.25 feet/second (11.75 feet/second to 13 feet/second).

Stone-lined banks that are disturbed during the culvert lining work will be restored after construction.

The proposed inlet will be approximately 5" below the existing inlet. The stream channel and banks will be graded to match the new inlet. Erosion control fabric and stone will be used to protect the channel and banks against scour.

(h) Not cause water quality degradation.

The project will not increase runoff since no new impervious surface is proposed. No water quality impacts from the culvert lining work are anticipated beyond potential temporary impacts during construction. Erosion and sediment controls (shown on enclosed plans) will be used to minimize these impacts.

*****Note: An alternative design for Tier 1 stream crossings must meet the general design criteria (Env-Wt 904.01) only to the *maximum extent practicable*.**

NEW HAMPSHIRE NATURAL HERITAGE BUREAU
NHB DATACHECK RESULTS LETTER

To: Melilotus Dube, New Hampshire Department of Transportation
7 Hazen Drive

Concord, NH 03301

From: NH Natural Heritage Bureau

Date: 8/3/2018 (valid for one year from this date)

Re: Review by NH Natural Heritage Bureau of request submitted 8/2/2018

NHB File ID: NHB18-2432 **Applicant:** Melilotus Dube

Location: Gilford
US Route 3 southbound on-ramp from NH Route 11A

Project Description: NHDOT Gilford 41655. The proposed project involves repairs to an existing 84" corrugated metal culvert carrying an unnamed stream under the southbound on ramp from NH Route 11A onto US Route 3 in the Town of Gilford. Repairs include shorten the headwall 16' on each end, construct new headwalls and slipline the remaining culvert. The existing condition is severely deteriorated and structurally deficient, leading to the formation of sinkholes above the ends of the culvert.

The NH Natural Heritage database has been checked by staff of the NH Natural Heritage Bureau and/or the NH Nongame and Endangered Species Program for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government.

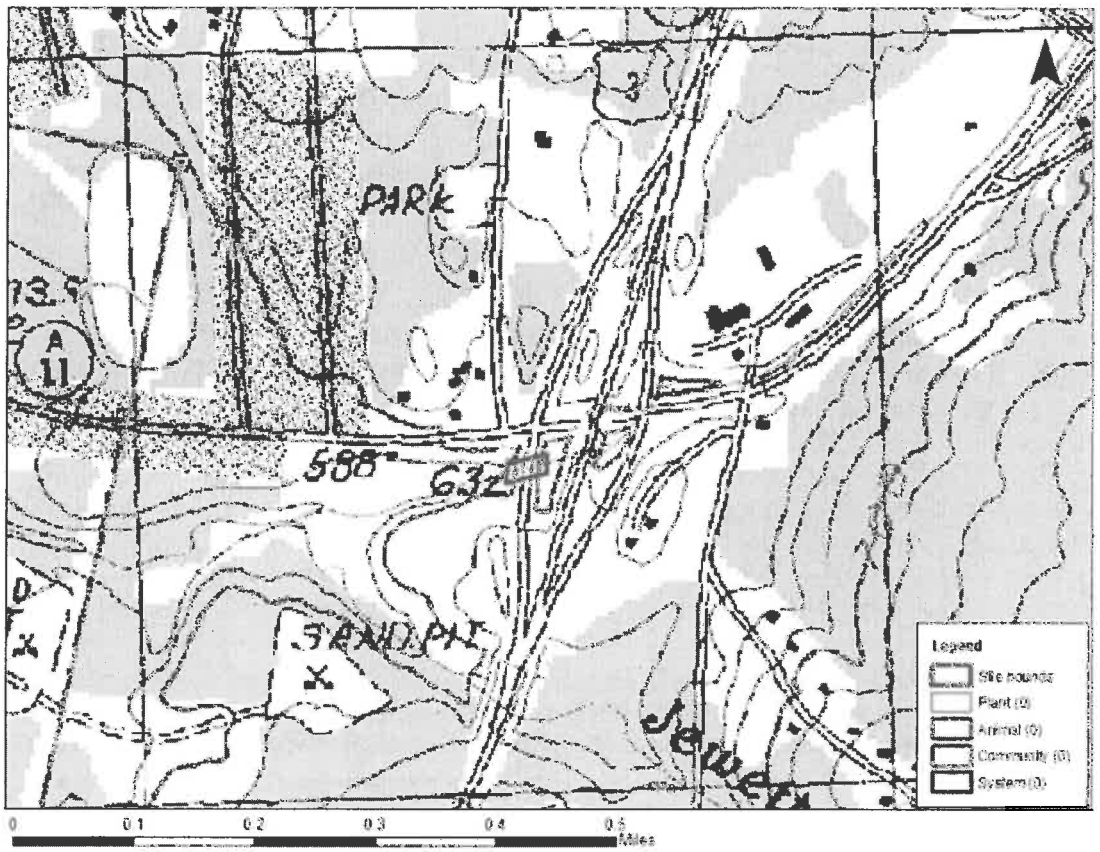
It was determined that, although there was a NHB record (e.g., rare wildlife, plant, and/or natural community) present in the vicinity, we do not expect that it will be impacted by the proposed project. This determination was made based on the project information submitted via the NHB Datacheck Tool on 8/2/2018, and cannot be used for any other project.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

MAP OF PROJECT BOUNDARIES FOR: **NHB18-2432**

NHB18-2432



Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To:
Consultation Code: 05E1NE00-2018-SLI-2712
Event Code: 05E1NE00-2018-E-06343
Project Name: Gilford 41655

August 14, 2018

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2018-SLI-2712

Event Code: 05E1NE00-2018-E-06343

Project Name: Gilford 41655

Project Type: TRANSPORTATION

Project Description: The proposed action will rehabilitate an existing 84" metal culvert which carries an unnamed scream under the southbound on-ramp from NH Route 11A to US Route 3. The preferred alternative is to shorten the existing culvert, construct new concrete headwalls and slip-line the remaining pipe.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/43.53074389224299N71.44334033423978W

Counties: Belknap, NH

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Flowering Plants

NAME	STATUS
Small Whorled Pogonia *Isotria medeoloides* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

IPaC Record Locator: 509-14406580 October 25, 2018

Subject: Consistency letter for the 'Gilford 41655' project (TAILS 05E1NE00-2018-R-2712) under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated to verify that the **Gilford 41655** (Proposed Action) may rely on the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, and may affect, and is likely to adversely affect the endangered Indiana bat (*Myotis sodalis*) and/or the threatened Northern long-eared bat (*Myotis septentrionalis*). Consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) is required.

This "may affect - likely to adversely affect" determination becomes effective when the lead Federal action agency or designated non-federal representative uses it to ask the Service to rely on the PBO to satisfy the agency's consultation requirements for this project. Please provide this consistency letter to the lead Federal action agency or its designated non-federal representative with a request for its review, and as the agency deems appropriate, transmittal to this Service Office for verification that the project is consistent with the PBO.

This Service Office will respond by letter to the requesting Federal action agency or designated non-federal representative within 30 calendar days to:

- verify that the Proposed Action is consistent with the scope of actions covered under the PBO;

- verify that all applicable avoidance, minimization, and compensation measures are included in the action proposal;
- identify any action-specific monitoring and reporting requirements, consistent with the monitoring and reporting requirements of the PBO, and
- identify anticipated incidental take.

ESA Section 7 compliance for this Proposed Action is not complete until the Federal action agency or its designated non-federal representative receives a verification letter from the Service.

For Proposed Actions that include bridge/structure removal, replacement, and/or maintenance activities: If your initial bridge/structure assessments failed to detect Indiana bats, but you later detect bats during construction, please submit the Post Assessment Discovery of Bats at Bridge/Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species and/or designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please advise the lead Federal action agency for the Proposed Action accordingly.

The following species may occur in your project area and **are not** covered by this determination:

- Small Whorled Pogonia, *Isotria medeoloides* (Threatened)

Project Description

The following project name and description was collected in IPaC as part of the endangered species review process.

Name

Gilford 41655

Description

The proposed action will rehabilitate an existing 84" metal culvert which carries an unnamed scream under the southbound on-ramp from NH Route 11A to US Route 3. The preferred alternative is to shorten the existing culvert, construct new concrete headwalls and slip-line the remaining pipe.

Yes

6. Is the project location 100-300 feet from the edge of existing road/rail surface?
   Yes

7. **Please verify:**
   No documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted between June 1 and July 31.

   Yes, I verify that no documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted during this period.

8. You have indicated that the following Avoidance and Minimization Measures (AMMs) will be implemented as part of the proposed project:
   - *General AMM 1*
   - *Lighting AMM 1*
   - *Tree Removal AMM 1*
   - *Tree Removal AMM 3*

Avoidance And Minimization Measures (AMMs)

These measures **were accepted** as part of this determination key result:

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

LIGHTING AMM 1

Direct temporary lighting away from suitable habitat during the active season.

TREE REMOVAL AMM 1

Modify all phases/aspects of the project (e.g., temporary work areas, alignments) to avoid tree removal.

TREE REMOVAL AMM 3

Ensure tree removal is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).

Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat

This key was last updated in IPaC on March 16, 2018. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the threatened **Northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

January 8, 2018

To Whom It May Concern:

This project was reviewed for the presence of federally listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

http://www.fws.gov/newengland/EndangeredSpec-Consultation.htm (accessed January 2018)

Based on information currently available to us, no federally listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under section 7 of the Endangered Species Act is not required. No further Endangered Species Act coordination is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact David Simmons of this office at 603-227-6425 if we can be of further assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Projects with Minimal Potential to Cause Effects

Date Reviewed: Click here to enter a date. 9/5/2018

Project Name: Gilford

State Number: 41655 **FHWA Number:** X-A004(710)

Environmental Contact: Meli Dube **DOT**
Email Address: Melilotus.Dube@dot.nh.gov **Project Manager:** Kirk Mudgett

Project Description: The proposed project will rehabilitate an existing 84" CMP carrying an unnamed stream under the southbound on-ramp from NH Route 11A to US Route 3 in the Town of Gilford. Proposed work will include repairing the existing deteriorated outlet with concrete and replacing existing stone, shortening the existing inlet by 18' and installing a concrete headwall and lining the remaining pipe with metal plates to stabilize the deterioration and provide adequate structural support. The installation of metal plates will require removing sections of deteriorated invert and will result in a proposed invert elevation that is 5" below the existing invert elevation. Construction of temporary access roads to the inlet and outlet sides will be necessary. The existing culvert was installed in 1964. Alternatives considered were replacement in-kind and replacement with a 8' wide by 7' high embedded box culvert.

Please select the applicable undertaking type(s):

☐	1. Modernization and general highway maintenance **that may require additional highway right-of-way or easement**, and which is **not within the boundaries of a historic property or district,** including:
	Choose an item. Choose an item.
☒	2. Non-historic bridge and culvert maintenance, renovation, or total replacement, **that may require minor additional right-of-way or easement**, and which is **not within the boundaries of a historic property or district**, including:
	a. replacement of maintenance of drainage pipes and culverts made of steel, plastic and concrete Choose an item.
☐	3. Historic bridge maintenance activities within the limits of existing right-of-way, including:
	Choose an item. Choose an item.
☐	4. Stream stabilization and restoration activities (including removal of debris or sediment obstructing the natural waterway, or any non-invasive action to restore natural conditions).
☐	5. Construction of bicycle lanes and pedestrian walkways, sidewalks, shared-use paths and facilities, small passenger shelters, and alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons, **not within the boundaries of a historic property or district**.
☐	6. Installation of bicycle racks, **not within the boundaries of a historic property or district**.
☐	7. Recreational trail construction, **not within the boundaries of a historic property or district**.
☐	8. Recreational trail maintenance when done on existing alignment.
☐	9. Modernization, maintenance, and safety improvements of railroad facilities within the existing railroad or highway right-of-way, **not within the boundaries of a historic property or district, and no historic railroad features are impacted,** including, but not limited to:
	Choose an item. Choose an item.
☐	10. Acquisition or renewal of scenic, conservation, habitat, or other land preservation easements
☐	11. Installation of Intelligent Transportation Systems.

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Projects with Minimal Potential to Cause Effects

Please describe how this project is applicable under Appendix B of the Programmatic Agreement.

The proposed project meets the intent of Appendix B of the Section 106 Programmatic Agreement because all work is for the purpose of maintenance of an existing structure. The rehabilitation efforts are being pursued as the preferred option over full replacement due to the increased cost and disturbance associated with replacement.

NHDOT in-house projects: Please append photographs, USGS maps, design plans and as-built plans, if available, for review.

LPA projects: Please submit this Certification Form along with the Transportation RPR

Coordination Efforts:

Has an RPR been submitted to NHDOT for this project?	No	NHDHR R&C # assigned?	Click here to enter text
Please identify public outreach effort contacts; method of outreach and date:	Initial Contact Letters were sent to all Town Officials, including the Historic District Commission on August 14, 2018. Responses have been received from the Town of Gilford Fire Chief and the Board of Selectmen with no concerns for impacts to cultural or archaeological resources noted. The Fire Chief commented that he believes many stone walls were destroyed during the original construction of the bypass.		

Finding: (To be filled out by NHDOT Cultural Resources Staff)

☒	**No Potential to Cause Effects**	☐	**No Historic Properties Affected**

This finding serves as the Section 106 Memorandum for your environmental documents, no further coordination is necessary.

☐ This project does *not* comply with Appendix B, and will continue under the Section 106 review process outlined in 36 CFR 800.3-800.7. Please contact NHDOT Cultural Resources Staff to determine next steps.

NHDOT comments: This culvert falls under the Post-1945 Program Comment

Jill Edelman — NHDOT Cultural Resources Staff

9/5/2018 — Date

Coordination of the Section 106 process should begin as early as possible in the planning phase of the project (undertaking) so as not to cause a delay.

Project sponsors should not predetermine a Section 106 finding under the assumption that an undertaking conforms to the types listed in Appendix B until this form is signed by the NHDOT Bureau of Environment Cultural Resources Program staff.

Every project shall be coordinated with, and reviewed by the NHDOT-BOE Cultural Resources Program in accordance with the Cultural Resources Programmatic Agreement among the Advisory Council on Historic Preservation, Federal Highway Administration, NH Department of Transportation, and the State Historic Preservation Office. In accordance with the Advisory Council's regulations, we will continue to consult, as appropriate, as this project proceeds.

If any portion of the undertaking is not entirely limited to any one or a combination of the types specified in Appendix B (with, or without a portion that is included as a type listed in Appendix A), please continue discussions with NHDOT Cultural Resources staff.

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Projects with Minimal Potential to Cause Effects

This No Potential to Cause Effect or No Historic Properties Affected project determination is your Section 106 finding, as defined in the Programmatic Agreement.

Should project plans change, please inform the NHDOT Cultural Resources staff in accordance with Stipulation VII of the Programmatic Agreement.

Figure 1. View of approximate location for construction of temporary access to the culvert outlet on the western side of the ramp.

Figure 2. View of the outlet of the existing 85" CMP on the western side of the SB on-ramp from NH Route 11A to US Route 3.

Figure 3. View of approximate location for construction of temporary access to the culvert inlet on the eastern side of the ramp.

Figure 4. View of the inlet of the existing 85" CMP on the eastern side of the SB on-ramp from NH Route 11A to US Route 3.

US Army Corps of Engineers®
New England District

New Hampshire General Permits (GPs)
Appendix B - Corps Secondary Impacts Checklist
(for inland wetland/waterway fill projects in New Hampshire)

1. Attach any explanations to this checklist. Lack of information could delay a Corps permit determination.
2. All references to "work" include all work associated with the project construction and operation. Work includes filling, clearing, flooding, draining, excavation, dozing, stumping, etc.
3. See GC 5, regarding single and complete projects.
4. Contact the Corps at (978) 318-8832 with any questions.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*	X	
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	X	
2.2 Are there proposed impacts to SAS, special wetlands. Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) DataCheck Tool for information about resources located on the property at https://www2.des.state.nh.us/nhb_datacheck/. The book Natural Community Systems of New Hampshire also contains specific information about the natural communities found in NH.		X
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	X	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)	X	
2.5 The overall project site is more than 40 acres?		X
2.6 What is the area of the previously filled wetlands?	~10,000 SF	
2.7 What is the area of the proposed fill in wetlands?	0 SF	
2.8 What is the % of previously and proposed fill in wetlands to the overall project site?	~34%	
3. Wildlife	Yes	No
3.1 Has the NHB & USFWS determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require an NHB ID number & a USFWS IPAC determination.) NHB DataCheck Tool: https://www2.des.state.nh.us/nhb_datacheck/ USFWS IPAC website: https://ecos.fws.gov/ipac/location/index	X	

3.2 Would work occur in any area identified as either "Highest Ranked Habitat in N.H." or "Highest Ranked Habitat in Ecological Region"? (These areas are colored magenta and green, respectively, on NH Fish and Game's map, "2010 Highest Ranked Wildlife Habitat by Ecological Condition.") Map information can be found at: • PDF: www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm. • Data Mapper: www.granit.unh.edu. • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html.		X
3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		X
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		X
3.5 Are stream crossings designed in accordance with the GC 21?	X	
4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?	X	
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?	N/A	
5. Historic/Archaeological Resources		
For a minimum, minor or major impact project - a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) with your DES file number shall be sent to the NH Division of Historical Resources as required on Page 11 GC 8(d) of the GP document**	X	

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.
** If your project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law.

Additional Information:

1.1 The unnamed stream within the project area and Jewett Brook (located approximately 1,000 feet downstream of the project) do not have any listed impairments, however they have TMDLs for E. coli and mercury.

2.1 An unnamed tributary to Jewett Brook passes through the culvert that is being rehabilitated.

2.4 The project will involve approximately 3,000 SF of vegetation clearing for access and staging during construction. Areas that are cleared will be allowed to re-establish once construction is complete.

2.6 The area of previously filled wetlands is not known but was estimated to be approximately 10,000 SF. This includes the portion of the on ramp and fill located between the two wetlands.

3.1 The NHB report indicated that a record is in the vicinity of the project, but there would be no impacts. The USFWS IPaC report listed northern long-eared bat (NLEB) and small whorled pogonia. There are no small whorled-pogonia records in Gilford, so no impacts from the project are anticipated. The project was reviewed under the revised February 5, 2018 FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) and was determined to "may affect and is likely to adversely affect" NLEB. A consistency letter for the project was received on October 25, 2018. Concurrence from USFWS is pending.

4.1 The project is located within a Zone A (100 year) floodplain. The project will not result in a substantial amount of fill within the floodplain so no loss of flood storage is anticipated.

Photo 1. Culvert inlet (view west, looking downstream)

Photo 2. Culvert outlet (view east, looking upstream)

Photo 3. View south toward culvert inlet

Photo 4. View southwest toward on ramp and culvert inlet, showing construction access route

Photo 5. View north along on ramp. Culvert outlet is in forested area on left side of photo

Gilford 41655

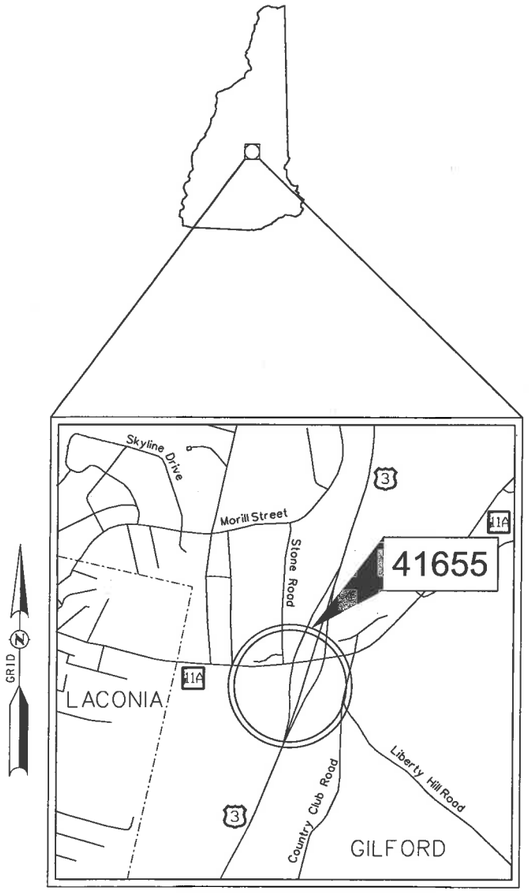
CONSTRUCTION SEQUENCE

1. Install perimeter controls
2. Perform necessary clearing operations for access and staging
3. Place temporary protection such as mats or stone over geotextile where access roads cross wetlands
4. Install cofferdam for excavation of slope at inlet
5. Install water diversion at inlet and other sedimentation controls/BMP's as needed
6. Clean and inspect existing pipe
7. Excavate around existing pipe inlet and remove mitered end and approximately 12' of pipe.
8. Install structural plate liner along length of pipe and extend liner to new headwall location.
9. Form and cast-in-place concrete footing elements
10. Form and cast-in-place concrete head wall and wing walls
11. Extend inlet side stream channel to new headwall, reset existing stone along banks
12. Backfill behind head wall and wing walls, fill sinkhole on slope, restore slope to existing grade.
13. Place humus, seed, mulch, and erosion control matting on slope
14. Repair outlet side mitered end with concrete
15. Reset existing stone at outlet to match new invert
16. Remove water diversion, re-establish flow through culvert
17. Replace slope drain
18. Remove temporary access roads
19. Stabilize disturbed areas
20. Remove erosion control measures

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

WETLAND IMPACT PLANS
CULVERT REHABILITATION PROJECT

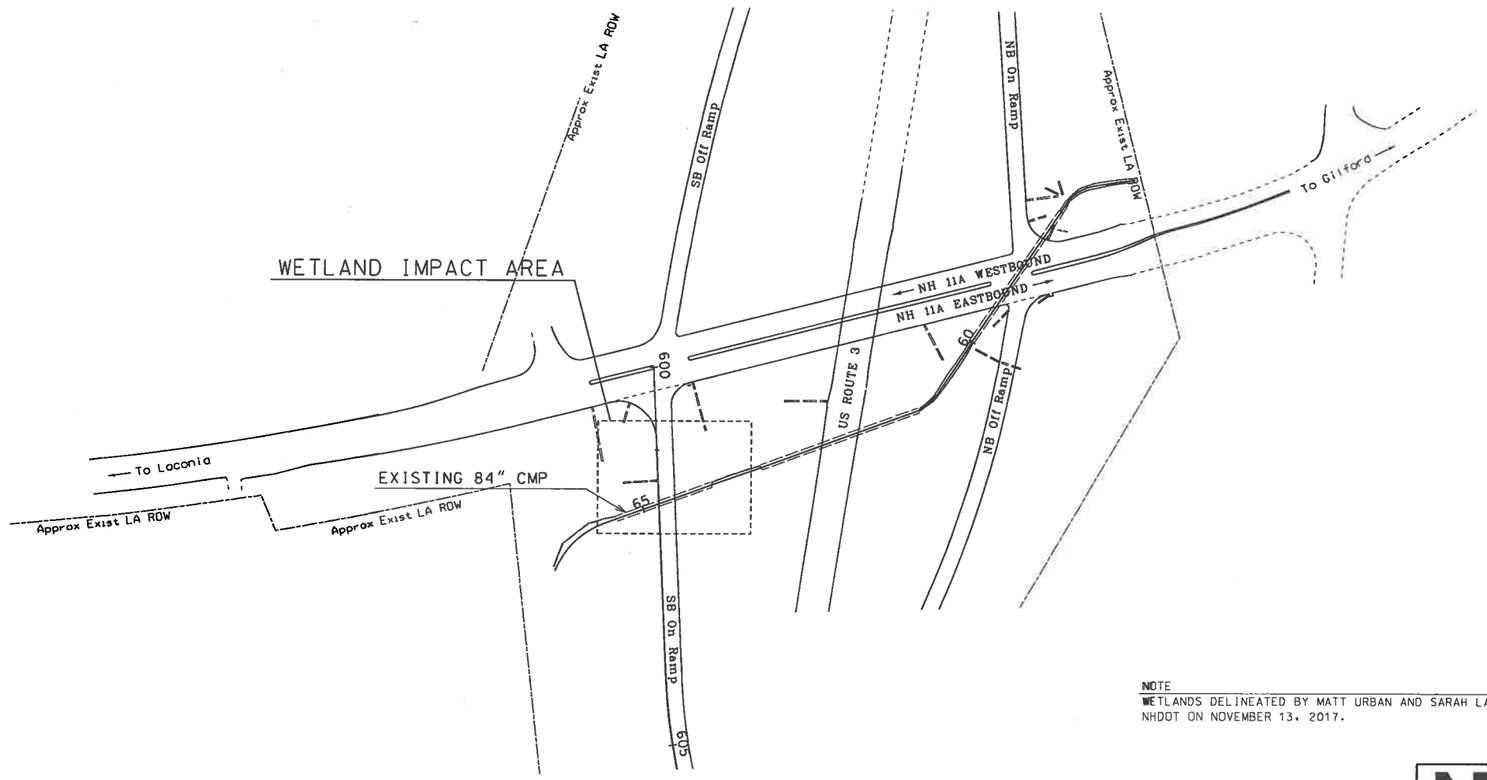
N.H. PROJECT NO. 41655
SB ON RAMP AT NH ROUTE 11A/US ROUTE 3 INTERCHANGE



LOCATION MAP

¼ ⅛ 0 ¼ ½ mi.

GRAPHIC SCALE



INDEX OF SHEETS

NOTE
WETLANDS DELINEATED BY MATT URBAN AND SARAH LARGE OF NHDOT ON NOVEMBER 13, 2017.

DRAWN BY S. HILL DATE 10/2018
CHECKED BY J. MERCER DATE 10/2018

TOWN OF GILFORD
COUNTY OF BELKNAP
SCALE: 1" = 100'
FOR CONSTRUCTION DETAILS - SEE CONSTRUCTION PLANS

11/20/2018

GM2 Associates, Inc.
197 Loudon Road, Suite 310
Concord, NH 03301
Tel: 603-856-7854
Fax: 603-856-7855

NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

SB ON RAMP AT NH ROUTE 11A/ US ROUTE 3 INTERCHANGE CULVERT REHABILITATION WETLAND IMPACT PLANS

FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A004(710)	41655	1	6

GENERAL

EDGE OF PAVEMENT — PROPOSED ROADWAY
TRAVELED WAY — existing roadway — (pavement removed outside slope lines)

DRIVEWAYS — (label surface type)

BUILDINGS — (building to be removed)
(label house or type of building)

FOUNDATION — (label type)

LEACH FIELD — leach field

BRIDGE CROSSINGS — STREAM — OVERPASS

STEPS AND WALK — (label type)

INTERMITTENT WATER COURSE

SHORE LINE — river/stream — pond — (label name of water body)

POTENTIAL WET AREA SYMBOL

BRUSH OR WOODS LINE

TREES (PLANS) — (deciduous) (coniferous) (stump)
(show station, circumference in feet & type)

TREE OR STUMP (CROSS-SECTIONS)

HEDGE — (label type)

MONITORING WELL — mon

WELL

FLAG POLE — fp

ORIGINAL GROUND (TYPICALS)

ROCK OUTCROP

ROCK LINE (TYPICALS & SECTIONS ONLY)

GUARDRAIL (label type) — existing — PROPOSED — bgr — cgr

JERSEY BARRIER

CURB (LABEL TYPE)

STONE WALL

RETAINING WALL (LABEL TYPE) — (points toward retained ground)

FENCE (LABEL TYPE)

SIGNS — (single post) — (double post)

GAS PUMP — gp

FUEL TANK (ABOVE GROUND) — ft (label size & type)

STORAGE TANK FILLER CAP — fc

SEPTIC TANK — S

GRAVE — gr

MAILBOX — mb

VENT PIPE — vp

SATELLITE DISH ANTENNA — da

PHONE — ph

GROUND LIGHT/LAMP POST — gl — lp

BORING LOCATION — B

TEST PIT — TP

INTERSTATE NUMBERED HIGHWAY — 291

UNITED STATES NUMBERED HIGHWAY — 3

STATE NUMBERED HIGHWAY — 102

SHORELAND - WETLAND

WETLAND DESIGNATION AND TYPE — 2 PUB2E

DELINEATED WETLAND — DW
ORDINARY HIGH WATER — OHW
TOP OF BANK — TOB
TOP OF BANK & ORDINARY HIGH WATER — TOBOHW
NORMAL HIGH WATER — NHW
WIDTH AT BANK FULL — WBF
PRIME WETLAND — PWET
PRIME WETLAND 100' BUFFER — PWET100
NON-JURISDICTIONAL DRAINAGE AREA — NJDA
COWARDIN DISTINCTION LINE — CDL
TIDAL BUFFER ZONE — TBZ
DEVELOPED TIDAL BUFFER ZONE — DTBZ
HIGHEST OBSERVABLE TIDE LINE — HOTL
MEAN HIGH WATER — MHW
MEAN LOW WATER — MLW
VERNAL POOL — VP
SPECIAL AQUATIC SITE — SAS
REFERENCE LINE — REF
WATER FRONT BUFFER — WB50
NATURAL WOODLAND BUFFER — NWB150
PROTECTED SHORELAND — PS250
INVASIVE SPECIES LABEL — I.S. I — I.S. II
INVASIVE SPECIES — INV

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY — FP500
100 YEAR FLOODPLAIN BOUNDARY — FP100
FLOODWAY — FW

ENGINEERING

CONSTRUCTION BASELINE — 30 — 31 — 32

PC, PT, POT (ON CONST BASELINE)

PI (IN CONSTRUCTION BASELINES)

INTERSECTION OR EQUATION OF TWO LINES

ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)

PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)

CLEARING LINE — SLOPE LINE

SLOPE LINE

SLOPE LINE (FILL)

SLOPE LINE (CUT)

PROFILES AND CROSS SECTIONS:
ORIGINAL GROUND ELEVATION (LEFT) — 72.5
FINISHED GRADE ELEVATION (RIGHT) — 79.14

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	STDSYMB 1	41655	2	6

DRAINAGE

MANHOLE

CATCH BASIN — ⊡cb

DROP INLET — ⊡ di

(existing) (PROPOSED)

DRAINAGE PIPE (existing) (label size & type)

DRAINAGE PIPE (PROPOSED)

UNDERDRAIN (existing) W/ FLUSHING BASIN — fb (label size & type)

UNDERDRAIN (PROPOSED) W/ FLUSHING BASIN

show direction of flow

HEADER (existing & PROPOSED) (with stone outlet protection)

END SECTION (existing & PROPOSED) METAL or PLASTIC / RCP

OPEN DITCH (PROPOSED)

EROSION CONTROL/ STONE SLOPE PROTECTION

BOUNDARIES / RIGHT-OF-WAY

RIGHT-OF-WAY LINE (label type)

RR RIGHT-OF-WAY LINE

PROPERTY LINE

PROPERTY LINE (COMMON OWNER) — Z — Z —

TOWN LINE — BOW / CONCORD

COUNTY LINE — COOS / GRAFTON

STATE LINE — MAINE / NEW HAMPSHIRE

NATIONAL FOREST

CONSERVATION LAND — LC — LC —

BENCH MARK / SURVEY DISK

BOUND — ⊡ bnd (PROPOSED)

STATE LINE/ TOWN LINE MONUMENT — ⊡ S/L ⊡ T/L

NHDOT PROJECT MARKER

IRON PIPE OR PIN — ip

DRILL HOLE IN ROCK — dh

TAX MAP AND LOT NUMBER — 156 / 14 — 1642/341 — 6.80 Ac.±

PROPERTY PARCEL NUMBER — 12

HISTORIC PROPERTY — H

UTILITIES

	existing	PROPOSED
TELEPHONE POLE		
POWER POLE		
JOINT OCCUPANCY		
MISCELLANEOUS/UNKNOWN POLE		
GUY POLE OR PUSH BRACE		

(plot point at face not center of symbol)

LIGHT POLE		
LIGHT ON POWER POLE		
LIGHT ON JOINT POLE		

POLE STATUS: REMOVE, LEAVE, PROPOSED, OR TEMPORARY AS APPLICABLE e.g.: R L — P+04 25.0' — T+04 25.0'

RAILROAD — (label ownership)

RAILROAD SIGN

RAILROAD SIGNAL

UTILITY JUNCTION BOX — ⊠jb — ⊠JB

OVERHEAD WIRE — OW — OW — (label type)

UNDERGROUND UTILITIES

WATER (on existing lines label size, type and note if abandoned)	W — W	PW — PW
SEWER	S — S	PS — PS
TELEPHONE	T — T	PT — PT
ELECTRIC	E — E	PE — PE
GAS	G — G	PG — PG
LIGHTING	L — L	PL — PL
INTELLIGENT TRANSPORTATION SYSTEM	ITS — ITS	PITS — PITS
FIBER OPTIC	FO — FO	PFO — PFO
WATER SHUT OFF	WSO	WSO
GAS SHUT OFF	GSO	GSO
HYDRANT	HYD	HYD

MANHOLES

SEWER	S	MHS
TELEPHONE	T	MHT
ELECTRICAL	E	MHE
GAS	G	MHG
UNKNOWN	U	

TRAFFIC SIGNALS / ITS

	existing	PROPOSED
MAST ARM (existing)		30' MA (NOTE ANGLE FROM ℄)
OPTICOM RECEIVER		
OPTICOM STROBE		
TRAFFIC SIGNAL		
PEDESTAL WITH PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON UNIT		
SIGNAL CONDUIT	C — C — C	PC — PC — PC
CONTROLLER CABINET	⊠cc	⊠CC
METER PEDESTAL	⊠ mp	⊠ MP
PULL BOX	□ pb	□ PB
LOOP DETECTOR (QUADRUPOLE)		(label size)
LOOP DETECTOR (RECTANGULAR)		(label size)
CAMERA POLE (CCTV)		
FIBER OPTIC DELINEATOR	fod	FOD
FIBER OPTIC SPLICE VAULT	SVF	SVF
ITS EQUIPMENT CABINET	⊠its	⊠ITS
VARIABLE SPEED LIMIT SIGN		
DYNAMIC MESSAGE SIGN		
ROAD AND WEATHER INFO SYSTEM		

CONSTRUCTION NOTES

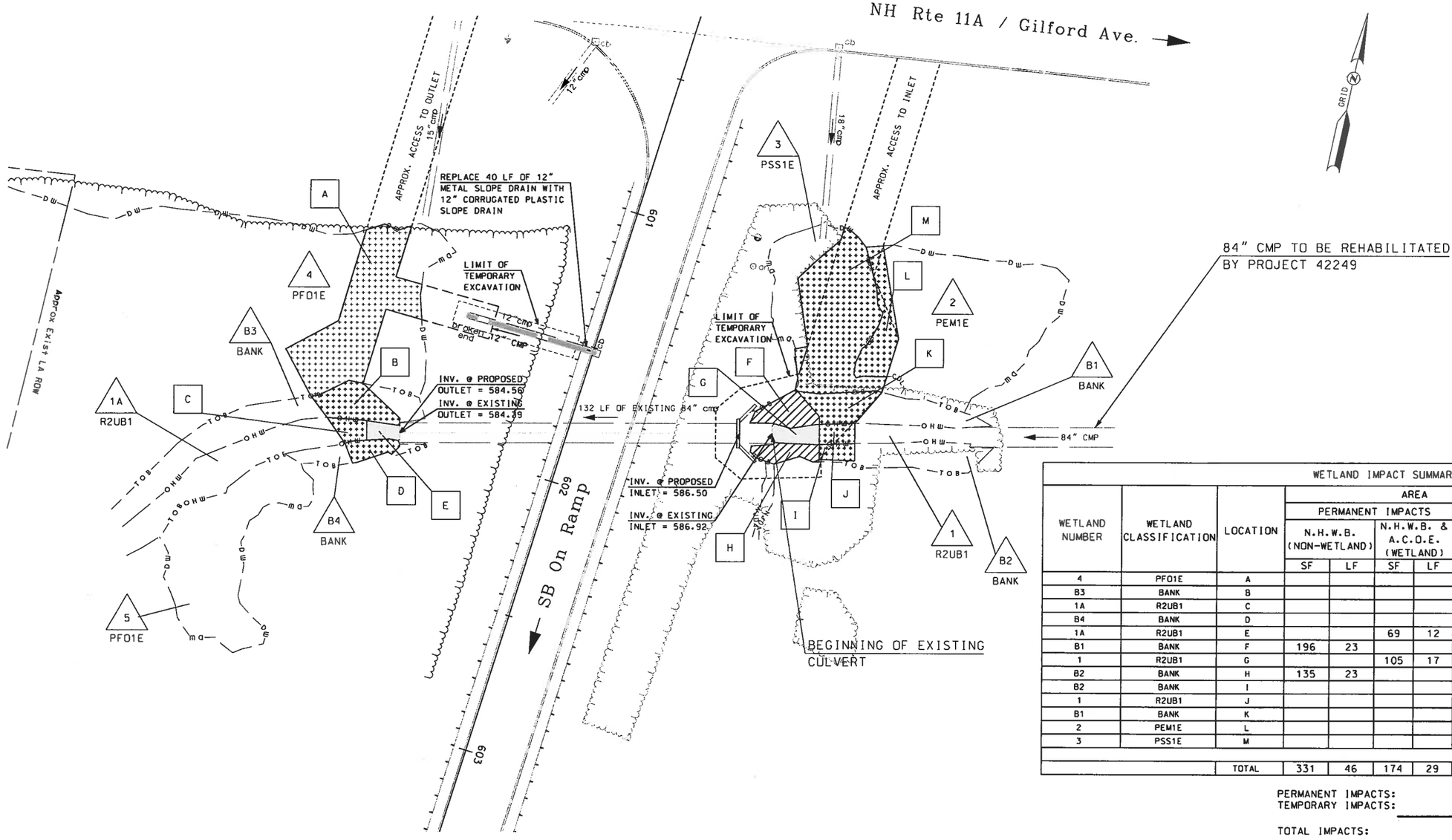
CURB MARK NUMBER - BITUMINOUS	B-1
CURB MARK NUMBER - GRANITE	G-1
CLEARING AND GRUBBING AREA	A
DRAINAGE NOTE	1
EROSION CONTROL NOTE	A
FENCING NOTE	A
GUARDRAIL NOTE	1
ITS NOTE	1
LIGHTING NOTE	A
TRAFFIC SIGNAL NOTE	1

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9-1-2016	STDSYMB 2	41655	3	6



WETLAND IMPACT SUMMARY

WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	AREA						LINEAR STREAM IMPACTS FOR MITIGATION		
			PERMANENT IMPACTS				TEMPORARY IMPACTS		PERMANENT		
			N.H.W.B. (NON-WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)				BANK LEFT	BANK RIGHT	CHANNEL
			SF	LF	SF	LF	SF	LF	LF	LF	LF
4	PFO1E	A					1243				
B3	BANK	B					287	26			
1A	R2UB1	C					88	10			
B4	BANK	D					108	26			
1A	R2UB1	E			69	12					0
B1	BANK	F	196	23						0	
1	R2UB1	G			105	17					0
B2	BANK	H	135	23					0		
B2	BANK	I					72	13			
1	R2UB1	J					90	13			
B1	BANK	K					226	30			
2	PEM1E	L					345				
3	PSS1E	M					1296				
		TOTAL	331	46	174	29	3755	118	0	0	0

PERMANENT IMPACTS: 505 SF
TEMPORARY IMPACTS: 3755 SF
TOTAL IMPACTS: 4260 SF

IMPACTS TO BANKS: TEMPORARY: 95 LF PERMANENT: 46 LF
IMPACTS TO CHANNEL: TEMPORARY: 23 LF PERMANENT: 29 LF

WETLAND CLASSIFICATION CODES	
PEM1E	PALUSTRINE. EMERGENT. PERSISTENT. SEASONALLY FLOODED/SATURATED
R2UB1	RIVERINE. LOWER PERENNIAL. UNCONSOLIDATED BOTTOM. COBBLE/GRAVEL
PSS1E	PALUSTRINE. SCRUB-SHRUB. BROAD-LEAVED DECIDUOUS. SEASONALLY FLOODED/SATURATED
PFO1E	PALUSTRINE. FORESTED. BROAD-LEAVED DECIDUOUS. SEASONALLY FLOODED/SATURATED

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORPS OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

△ # WETLAND DESIGNATION NUMBER

WETLAND IMPACT LOCATION

THE STATE OF NEW HAMPSHIRE
THOMAS P. LEVINS
NO. 7555
LICENSED
PROFESSIONAL ENGINEER
11/19/18

ENGINEERED BY:
THOMAS P. LEVINS, PE
GM2 ASSOCIATES, INC.
11/19/2018

NOTES:
1) PROJECT IS LOCATED WITHIN 100-YEAR (ZONE A) FLOODPLAIN.
2) ALL WORK WILL BE WITHIN THE EXISTING ROW.

20 0 20 40
SCALE IN FEET

GM2 ASSOCIATES

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLAN

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41655_pwt01	41655	4	6

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	DATE

SDR PROCESSED	NHDOT	DATE 1/16/2018
NEW DESIGN	BAW	DATE 10/2018
SHEET CHECKED	TPL	DATE 10/2018
AS BUILT DETAILS		DATE

EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:
   1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
   1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).
   1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.
   1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).
   1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WQ 1500 REQUIREMENTS (HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM)
   1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.

2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:
   2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.
   2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.
   2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.
   2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
      (A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
      (B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
      (C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;
      (D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED
   2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.
   2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
   2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.
   2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30" AND MAY 1" OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
      (A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.
      (B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
      (C) AFTER NOVEMBER 30" INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.
      (D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WQ 1505.02 AND ENV-WQ 1505.05.
      (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WQ 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30".

GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS

3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:
   3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.
   3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.
   3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.
   3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.
   3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.

4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:
   4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.
   4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.
   4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1" THROUGH NOVEMBER 30". OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.

5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:
   5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.
   5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS. SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.
   5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.
   5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.
   5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS. VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.

6. PROTECT SLOPES:
   6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.
   6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.
   6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.
   6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.

7. ESTABLISH STABILIZED CONSTRUCTION EXITS:
   7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.
   7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.

8. PROTECT STORM DRAIN INLETS:
   8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.
   8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.
   8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.
   8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.

9. SOIL STABILIZATION:
   9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.
   9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)
   9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR. IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.
   9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.

10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:
   10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WQ 1506.10) SHALL BE SIZED TO RETAIN, ON SITE. THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER. TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.
   10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.
   10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:
   11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.
   11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.
   11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.
   11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.
   11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.
   11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.
   11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.
   11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
   11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:
   12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500: ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.
   12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.
   12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.
   12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.
   12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%. THE DEPARTMENT WILL CONSIDER USING ERDSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.
   12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.
   12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.

13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:
   13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.
   13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.
   13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRIXES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.
   13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.

14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:
   14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.
   14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1, IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.
   14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WQ 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES[2]				ROLLED EROSION CONTROL BLANKETS[3]			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES[1]												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES'	YES'	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

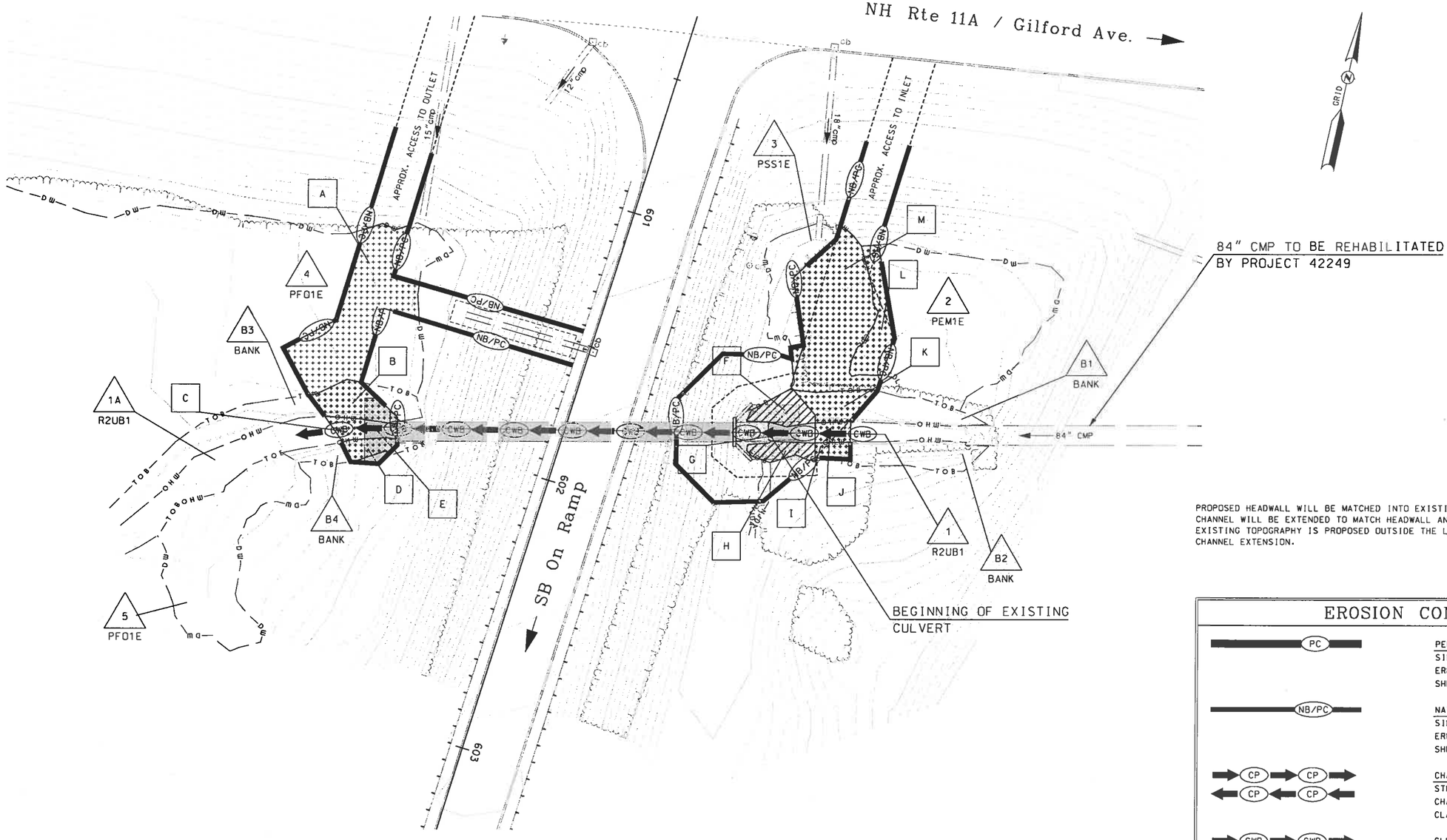
ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNSCB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH ≤10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL STRATEGIES

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12-21-2015	41655_erostrat	41655	5	6



PROPOSED HEADWALL WILL BE MATCHED INTO EXISTING SLOPE AND EXISTING STREAM CHANNEL WILL BE EXTENDED TO MATCH HEADWALL AND PIPE INVERT. NO ALTERATION TO EXISTING TOPOGRAPHY IS PROPOSED OUTSIDE THE LIMITS OF THE HEADWALL AND STREAM CHANNEL EXTENSION.

EROSION CONTROL LEGEND

PC — PERIMETER CONTROL
SILT FENCE. EROSION CONTROL MIX BERM
EROSION CONTROL MIX SOX. TURBIDITY CURTAIN
SHEET PILE. COFFER DAM

NB/PC — NATURAL BUFFER/PERIMETER CONTROL
SILT FENCE. EROSION CONTROL MIX BERM
EROSION CONTROL MIX SOX. TURBIDITY CURTAIN
SHEET PILE. COFFER DAM

CP — CHANNEL PROTECTION
STONE CHECK DAMS. STRAW WATTLES
CHANNEL MATTING. CLASS D EROSION STONE
CLASS C STONE

CWB — CLEAN WATER BYPASS
PUMP THROUGH PIPE. DRAIN THROUGH PIPE OR CHANNEL

WETLAND CLASSIFICATION CODES	
PEM1E	PALUSTRINE. EMERGENT. PERSISTENT. SEASONALLY FLOODED/SATURATED
R2UB1	RIVERINE. LOWER PERENNIAL. UNCONSOLIDATED BOTTOM. COBBLE/GRAVEL
PSS1E	PALUSTRINE. SCRUB-SHRUB. BROAD-LEAVED DECIDUOUS. SEASONALLY FLOODED/SATURATED
PFO1E	PALUSTRINE. FORESTED. BROAD-LEAVED DECIDUOUS. SEASONALLY FLOODED/SATURATED

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORPS OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

△ # — WETLAND DESIGNATION NUMBER

— WETLAND IMPACT LOCATION

THE STATE OF NEW HAMPSHIRE
THOMAS P. LEVINS NO. 7022
LICENSED PROFESSIONAL ENGINEER
11/19/18

ENGINEERED BY:
THOMAS P. LEVINS, PE
GM2 ASSOCIATES, INC.
11/19/2018

20 0 20 40
SCALE IN FEET

GM2 ASSOCIATES

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLAN

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
41655_pwt02	41655	6	6

REVISIONS AFTER PROPOSAL	STATION	DESCRIPTION	STATION	NUMBER	DATE

		DATE
SDR PROCESSED	NHDOT	1/16/2018
NEW DESIGN	BAW	10/2018
SHEET CHECKED	TPL	10/2018
AS BUILT DETAILS		DATE